AMERICAN SMELTING AND REFINING COMPANY
POST OFFICE BOX 151
PERTH AMBOY, N. J. 08861

127054

H. K. SPAULDING
MANAGER

June 30, 1970

Mr. Arthur W. Price, Chief
Solid Waste Disposal Program
State of New Jersey
Department of Environmental Protection
John Fitch Plaza, P. O. Box 1390
Trenton, New Jersey 08625

Dear Mr. Price:

Enclosed are two copies of the Application for Certification to Conduct a Refuse Disposal Operation for the Perth Amboy Plant of the American Smelting and Refining Company.

Specifically, this operation consists of a slag dump on Company owned property which has been used for the disposal of metallurgical slags and other inert refractory materials for many years.

If there is any further information required, please advise.

Very truly yours,

H. K. Spaulding
Manager

HKS:ek
Enc.

RECEIVED
JUL 1 1970
DEPARTMENT OF HEALTH

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION
P.O. BOX ~~1540~~ 1390, TRENTON, NEW JERSEY 08625

APPLICATION FOR CERTIFICATION TO CONDUCT A REFUSE DISPOSAL OPERATION

1. Name of operator(s) or corporation

American Smelting and Refining Company, A Corporation

Perth Amboy Plant

2. Trade Name ASARCO County Registered Hudson

3. Location of operation 425, 429, 430 p 74 on Tax Map of Perth Amboy (Block Numbers)

or P 291 - Line 10 on 1960 Tax List. (Lot Numbers)

Perth Amboy (Municipality) Middlesex (County)

4. Business mailing address of operator(s) P.O. Box 151

Perth Amboy, New Jersey 08861 (Zip Code) Telephone 201-826-6200

5. If incorporated, state where New Jersey (State)

6. Names and addresses of officers:

President C. F. Barber Address 120 Broadway, New York, N.Y.

Vice President K. D. Loughridge Address " "

Secretary A. J. Gillespie, Jr. Address " "

Treasurer R. J. Plumb, Jr. Address " "

Registered N.J. Agent Corporation Trust

15 Exchange Place, Jersey City, New Jersey 07302 (Address)

SUPPLEMENTAL ENGINEERING DATA
FOR SANITARY LANDFILL SITES
(Please Print or Type)

In accordance with the provisions of Regulation 4, Chapter VIII of the State Sanitary Code, the following information is required for each sanitary landfill operation currently in operation or planned. This form when completed by the design engineer will support the professional engineering design drawings (see last page) and is not to be considered a substitute in lieu thereof.

RESPONSIBLE PERSONS

1. Operator(s) of site AMERICAN SMELTING & REFINING COMPANY

   Business mailing address 1160 STATE STREET
   (Street)

   PERTH AMBOY, NEW JERSEY 08861 826-6200
   (Municipality) (State) (Zip) (Telephone)

2. Location of site PERTH AMBOY, N.J. MIDDLESEX
   (Municipality) (County)

3. Owner(s) of site AMERICAN SMELTING & REFINING COMPANY

   Mailing address 120 BROADWAY

   NEW YORK 5, NEW YORK

SITE SPECIFICS

1. Block & Lot Numbers BLOCK 425

2. Total acreage (±) 75.8 ACRES

3. Water Conditions NORMALLY DRY, EXCEPT FOR CRANE CREEK

   REFER TO DRWG. Nº 17575-A FOR BORING INFORMATION
   (Ground or Surface Water Conditions to be determined by borings and logged on engineering design drawings)

4. Soil characteristics LAND FILL AND STORAGE PRIMARILY FOR

   METALLURGICAL SLAGS, IRON CAKE AND REFRACTORY WASTE MATL.
   (Agriculture Soil Classifications determined by test holes and profiled on engineering design drawings)

5. Indicate ground cover, if any SOME AREAS ARE OVERGROWN WITH REEDS 4 TO 8 FT. TALL (REF. TO DRWG. # 17571-A FOR LOCATION)

6. Planned life expectancy 40 TO 50 YEARS

OPERATIONAL CONSIDERATIONS

1. Method: Trench ____ Area ✓ Ramp ____ Other or Combination

2. Cover material:
On site: Suitable Yes ✓ No ____
Sufficient Yes ✓ No ____

Off site: Where from BLAST FURNACE & CONVERTER PLANT OPERATIONS

Est. daily yardage ~~needed~~ DEPOSITED 5 TO 10 C.Y. PER DAY

3. Equipment: List with sizes

Operational	Standby
10 TON DUMP TRUCK (DAILY - PLANT OWNED)	
RENTAL OF EQUIPMENT ANNUALLY TO LEVEL AND GRADE SITE.	
DRUMS AND GRAPHITE COVERED WITHIN A WEEK AFTER DEPOSIT.	

4. State method of fighting fires

PLANT OWNED AND OPERATED FIRE FIGHTING APPARATUS (PUMPER FIRE TRUCK), PERTH AMBOY FIRE DEPT.

5. Utilities:

City water	Yes ✓ No ____	Nearest source	NORTH END OF SITE ~~ft.~~
Electicity	Yes ____ No ✓	Nearest source	____ ft.
Storm Sewers	Yes ____ No ✓	Nearest source	____ ft.
Sanitary Sewers	Yes ____ No ✓	Nearest source	____ ft.
Telephone	Yes ____ No ✓	Number	____

6. Daily operation 9 TO 11 a.m., ~~p.m.~~ to 1 TO 3 (~~a.m.~~, p.m.)

7. Weekly operation: S (M) (T) (W) (T) (F) S
(circle appropriate days)

2

6. Landfill service

Owners collection system Yes ✓ No ____

Est. No. trucks/wk 30 Est. tonnage/wk 210

Individual collectors

Est. No. trucks/wk NONE Est. tonnage/wk ~

List municipalities served

PLANT PROPER:- DISPOSING OF IRON CAKE, METALLURGICAL SLAGS, REFRACTORY WASTE MATERIAL, GRAPHITE BLOCKS AND DUST AND SCRAP STEEL DRUMS GENERATED THRU NORMAL PLANT OPERATIONS.

GOVERNMENTAL CONSIDERATIONS

1. Control exercised by:

Local NONE ~ (Specifically)

County NONE ~ (Specifically)

Other NONE ~ (Specifically)

*Provide explanatory commentary and copies of regulating ordinances

2. Zoning

Site zoned Yes ✓ No ____ How zoned HEAVY INDUSTRIAL

Restrictions ~

Site conforms to surrounding land use (Yes or No)

North YES East YES South YES West YES

If not zoned, check below existing land development

	North	East	South	West
Residential				
Commercial				
Light industrial				
Heavy industrial				
Rural				
Mixed				

3. Planned use of land upon termination of sanitary landfill construction project

POSSIBLE FUTURE PLANT EXPANSION.

4. If municipally held, has governing body taken action dedicating land for planned use as stated in No. 3

Yes — No —

5. Does this operation conform to State and County Regional Plans for solid waste systems

Yes ✓ No ____

6. Have applications been applied for a Certificate of Necessity from Public Utilities Commission

Yes ____ No ✓

ENGINEERING DESIGN

The professional engineering design requirements are as follows:

Four (4) sets of drawings (maximum sheet size 30" x 42" but preferably 24" x 36") consisting of the following:

1. Key map showing location of proposed work. Municipal or County Map, or equivalent is suggested.

2. Maps showing topographical, geological and hydrological conditions at the site and in the surrounding areas.

   ELEVATIONS based on the New Jersey Geodetic Control Survey datum. Use of any other datum must be supported by an explanatory statement and an equation to N.J.G.C.S. datum.

3. A plot plan showing operational areas, final elevations, and the stages and sequence of development of operations.

4. A typical refuse cell cross-sectional drawing.

5. Test boring logs showing soil profile and location of ground water.

6. Detailed drawings of any dikes, berms or other pollution protection devices that may be necessary.

The above data and drawings have been prepared by E. J. CAPUTO
Name of Engineer(to be typed)

1160 State St. P.O. Box 151
Address
Perth Amboy, New Jersey 08861

17211
New Jersey License Number

E. J. Caputo
Signature of Engineer

DATE July 20, 1971

RARITAN BAY PROJECT

INDUSTRIAL WASTES SURVEY

American Smelting and Refining Company
Perth Amboy, New Jersey

1. Date of Meeting: January 20, 1966

2. Personnel Participating:

The following is a list of men participating in this conference, grouped by organization represented:

American Smelting and Refining Company

Mr. George H. Weis, Plant Manager
Mr. C. B. Porter, General Plant Superintendent
Mr. G. Paulding, Plant Engineer
Mr. H. K. Spaulding, Assistant Manager

Federal Water Pollution Control Administration

Raritan Bay Project

Mr. John Ulshoefer, Recreational Resource Specialist
Mr. Richard T. Dewling, Chief, Operations

3. Purpose:

This meeting was scheduled by a letter from Mr. Paul De Falco, Jr., Raritan Bay Project Director, to Mr. G. H. Weis, Plant Manager, American Smelting and Refining Company, Perth Amboy, New Jersey. The purpose of this meeting was to discuss process wastes created by operation of this facility, as they relate to Arthur Kill and Raritan Bay pollution.

GENERAL INFORMATION

4. Organization:

American Smelting and Refining Company is located on the eastern edge of Perth Amboy, New Jersey, adjacent to the Arthur Kill. The facility occupies a total of 145 acres: 70 for operations and 75 for slag dumping. Approximately 1,400 people, 75 percent of which are on a day shift basis, are employed. The company's main executive and operating offices are located in New York City.

4/28/66

5. Products:

The following is a list of finished products and quantities produced:

Refined copper (bar, rod, cake)	13,500 tons per month
Brass alloys	600 tons per month
Antimonial alloys and oxides	175 tons per month
Refined gold	30,000 ounces per month
Refined silver	3,500,000 ounces per month

6. Raw Materials:

Raw materials used include:

Copper bullion	11,000 tons per month
Scrap copper and brass	5,000 tons per month
Antimonial crudes	50 tons per month
Precious metal scrap	40 tons per month

7. Capacity:

Plant capacity is given under the subheading 5. Products

8. Operations:

Given below is a flow diagram of all processes at this facility. Each is broken down with the following information: Name and description; raw materials; quantity of cooling and process water (fresh and salt); finished product; location of discharge and sizes of effluent channels or pipes; operation schedule (hours per day, days per month).

A. Refined Copper

Raw material - copper bullion
scrap copper and brass

↓

melt and cast to anodes

↓

electrolyze anodes

2,000,000 cu. ft. condensate water per month

↓ ——→ copper slimes

refined electrolytic copper

No effluent channels or pipes.

Water added to compensate for evaporation

4/28/66

Mould cooling water recirculated through cooling towers

B. Brass Alloys

Raw material - refined copper
" tin
" lead
" zinc
brass

↓

finished product

Melt and cast into special sizes and shapes of rods and tubes conforming to rigid chemical and physical specifications.

Mould cooling water recirculated through cooling tower

No effluent channels or pipes.

Operating 24 hrs./day, 30 days/month

C. Antimony Alloys and Oxides

Raw material - crude antimonial lead alloys

↓

process in steel kettles at high temperature

↓

finished product

Specification alloys of lead and antimony and antimony oxide

No water required - salt or fresh

No effluent channels or pipes.

Operating 24 hrs./day, 30 days/month

D. Refined Gold and Silver

Raw material - copper refinery slimes
precious metal scrap

↓

smelt in furnace to produce metal

↓

cast metal into anodes

↓

electrolyze

↓

finished product

4/28/66

Fresh water - 2,000 cu. ft./month replacement for evaporation

No effluent channels or pipes.

Operating 24 hrs./day, 22 days/month

9. Water Supply:

Two sources of water supply are available, namely Arthur Kill and the municipal supply from the City of Perth Amboy. Fresh water, used at a rate of 3,500,000 cubic feet per month, or approximately 875,000 gallons per day, is used for steam production, sanitary and drinking purposes, and for makeup water in the plant's recirculating cooling water system.

Salt water from the Arthur Kill, used at a rate of 5,000 gpm, or 7.2 mgd, is used mainly for jacketed cooling in condensers and furnaces.

10. Sewage:

All sanitary wastes from the facility go to the Perth Amboy sewer system. Process wastes discharged to Perth Amboy amount to 500,000 cubic feet per month, or 124,000 gpd.

11. Principal processes:

Refining is the principal process at this facility.

WATER POLLUTION ABATEMENT PROGRAM

The plant has five sewers, the location of which are shown on a company supplied map, which discharge either directly to the Kill or to small tributaries. The only wastes reportedly being carried by these conduits are cooling waters, condensate waters, and overflow water from the plant's cooling pond. As mentioned previously, all sanitary wastes and processing water goes to the city sewer system.

Analyses have never been performed on these discharges by either the company, Interstate Sanitation Commission, or the New Jersey State Health Department.

SUPPLEMENTARY INFORMATION AND SUMMARY

It is apparent from the foregoing that thought has been given to principal wastes sources at this plant. The collection of effluent data, however, are essential in demonstrating and documenting the fact that the only waters being discharged to the Arthur Kill are noncontaminated

cooling and condensate waters. It is, therefore, recommended that the company establish a routine sampling program on all discharge points. Analyses to be carried out should include, but not necessarily be restricted to DO, temperature, pH, BOD, and COD. Since the plant's cooling water recirculating pond, which overflows into one of the sewers, contains bosh water, it is suggested that the discharge also be analyzed for copper.

It is further recommended that the company establish a routine inspection program in the area of the slag lagoons. Particular attention should be given to the dikes to make sure that the area is not flooded during high tide.

4/28/66

The most permeable unit beneath the site is the "Middle Aquifer" or the Farrington Sand member of the Raritan Formation which underlies the Woodbridge Clay. The top of the Farrington sand occurs at depths of approximately 70 feet below grade in the site area (NJDEPE, 1994). The water quality of the Middle Aquifer has been adversely impacted by saltwater intrusion in the area of the site (NJDEPE, 1994). Saltwater from Woodbridge Creek has entered the Middle Aquifer approximately 1000 feet to the north of the site.

3.0 OPERATIONAL HISTORY

In March, 1894, M. Gugenheim purchased the tract of land in Perth Amboy, then known as Maurer, for the erection of a lead and copper refinery. Construction was started in the fall of 1894 and operations were begun in the lead refinery in the summer of 1895. Copper refinery operations were started a short time later. In 1901 ASARCO (then the American Smelting and Refining Company) acquired the operations from the Gugenheim's and expanded them until 1976 when all metal processing operations ceased.

ASARCO owned until 1981 - recision of sale 1991 -> Bridge management that Bridgeview a subsidia of ASARCC

Between 1981 and 1991 the site was owned and operated by Neuburne Brown (State Street Industrial Park). Mr. Brown performed demolition and other removal activities, including removal of USTs. During 1991 there was a recision of sale and Bridgeview Management Company, Inc. began managing the property. During the ten (10) year ownership by Mr. Brown the buildings and structures were not maintained and as a result deteriorated to an unsightly condition. Bridgeview Management Co. has been restoring the site since 1991. Bridgeview has removed waste materials and demolished buildings. Non-process brick was crushed and used as a preliminary capping material for site grading.

Per Oct. 24, 1994 letter from Tony Reiman to Rick.

Operations at the site have consisted of several technologies used to reduce non-ferrous materials to metallic form. These are thermal treatment to refine and separate metals, electrical purification of metals and leaching of metallic sediments and dusts. Both primary and secondary metal feed-stocks were used. The greatest volume of production was derived from primary metal sources. The reduced and purified metals were often cast into shapes according to customer specifications. Some metals were combined to produce common alloys such as brass and bronze, as well as other specialty combinations. Both cold and hot metal shaping was done on-site.

Major facilities built to perform and support the metal production functions are: Bulk material handling, in-plant transportation, fuel storage, steam generation, electrical power generation, smelting blast furnace, refining kettles, flues and dust handling, electrolytic copper refinery, and an electrolytic precious metals refinery (parting plant). Other facilities include: retort furnaces, reverberatory furnaces, rotary furnaces, sweater furnaces and induction furnaces. Casting was performed both as a batch and a continuous operation.

Many professions were required to operate this facility. The physical plant required a full maintenance facility complete with carpenters, painters, machinists, mechanics and even black-smiths. A crew of masons was employed full-time building and re-lining furnaces. A narrow-gauge railway serviced the entire plant, and it included a locomotive repair shop. The facility had a complete hospital, fire department and security department.

A research department was involved in metallurgy and process development. The facilities included optical and x-ray microscopy as well as material strength testing. A wet chemical laboratory was present on-site, but was razed during 1979.

In general, feed-stock material was brought on-site by rail or water transport. It was then stored and sampled for metal analysis. After analysis the material was either combined with specified fluxes and was subject to thermal treatment, or it was routed to the electrolytic refinery. Refined metal was either shipped in pigs or ingots to customers or sent to melting and casting operations. Final shipping was by rail, highway and water.

3.1 Bulk Material Handling

These facilities included storage bins for mineral fluxes, solid fuels and solid raw materials. These materials were delivered through the plant by rail, both standard and narrow-gauge. Out-door storage yards were used for refined metal ingots that were moved by overhead traveling cranes. Bulk fuel deliveries were made by ocean-going vessels and storage was provided in above ground tanks. In plant transfers were made by above ground piping and rail tank cars.

3.2 Steam and Power Generation

Initially a coal-fired and later fuel-oil fired steam-plant provided energy to generate electrical current. A direct current (DC) generator was necessary to operate the electrolytic metal refineries. The DC current was applied to metal cathodes and anodes emersed in an electrolyte solution. DC current was used in both the copper tank house and the parting plant. Alternating current (AC) was purchased from Public Service Electric and Gas.

3.3 Electrolytic Refining

Both copper and precious metals were refined using DC current and electrolyte baths. Lead-lined, concrete tanks were filled with sulfuric acid and copper sulfate solution. Unrefined copper cathodes and starter-plate anodes were suspended in this solution. Electric current was applied that caused metal to move into solution from a cathode and plate as pure metal onto an anode. Impurities dropped to the bottom of the tank as slimes.

3.4 Smelting

Primary and secondary metals were smelted in a coal (coke) fired blast furnace. A furnace charge was composed of metal scrap or ore, that was combined with coke fuel and inorganic fluxes such as limestone and silica. A forced draft of air was used to sustain temperatures high enough to melt the contained metal and additives. Non-contact cooling water was used to protect the furnace from the heat. Gasses created by this process were cooled in horizontal flue systems that were routed to dust-handling bag-houses. Slag wastes which contained no recoverable metal, were cooled and used for on-site fill material.

3.5 Refining

Metals were refined in a variety of refining kettles and furnaces. The metals were combined with fuels and inorganic fluxes to separate impurities by fractional distillation and partitioning through high-temperature chemical reactions. Refined metals were cast into shapes, while intermediates (drosses) were conducted to other refining operations. Gasses were conducted into the metal dust handling systems. Final slag waste products were cooled and used for fill.

3.6 Metal Dust Handling

Metal dusts that were created during the thermal treatment were recovered for further processing. These dusts precipitated in horizontal flue systems, settling chambers and bag-houses that were designed for dust recovery. Cooled flue gasses were conducted to emission stacks, after passing through the dust recovery process. The recovered dusts were used as furnace or metal-leaching feed-stock, depending upon the specific metal content.

3.7 Cooling Water

Large volumes of non-contact and contact cooling water were used in different operations. Jacketed furnaces and kettles consumed a large quantity of water that cycled through a large cooling pond. Individual cooling towers were associated with some smaller closed-loop systems.

3.8 Casting Operations

Molten metals were cast into a variety of shapes that were specified by customers. These operations entailed a casting area (floor) that was large enough to accommodate molds of molten material and in various stages of hardening. Once the metal had frozen, the shapes were removed from the mold and cooled to handling temperatures.

3.9 Slag, Ash and Brick Handling

Waste slag, coal ash and used brick were all historically used as fill material in low-lying areas. The site was filled from west to east using these materials. These materials were placed in a random manner, without any source segregation. Therefore the result is a heterogenous mixture of material with little or no spatial continuity.

6.15 LEAD REFINERY

6.15.1 Soil Sampling

During 1987 Killam collected two grab samples (S102 & S103) in the lead refinery area (Figure 8). Killam states that these samples were collected from locations where contamination was most likely to be present and analyzed for PPM. The laboratory results indicated that Sb, Cu, Pb and Zn were present at concentrations of 2,876 mg/kg, 7,654 mg/kg, 2,154 mg/kg and 9,320 mg/kg respectively (Table 1).

To further assess soil conditions in the Lead Refinery area, Killam advanced two (2) borings (B-2 & B-3) during April 1988, at the locations indicated on Figure 8. Three samples were collected from each boring and were analyzed for PPM. The metals As, Pb and Zn were identified at concentrations of 870 mg/mg, 208,000 mg/kg and 22,500 mg/kg respectively (Table 1).

6.16 LEAD SMELTER BAGHOUSE

6.16.1 Soil Sampling

During November 1981 ERT collected surficial soil sample ERT-7 to the south of the baghouse (Figure 8). The sample was analyzed for selected metals. The analytical results indicated that As, Cd, Pb and Zn were present at concentrations of 110 mg/kg, 270 mg/kg, 19,000 mg/kg and 30,000 mg/kg respectively (Table 1).

During April 1988 Killam advanced boring B-14 to the south of the ERT-7 location (Figure 8). Three (3) soil samples were collected and analyzed for PPM. The samples contained the metals Sb, As, Be, Cd, Cu, Pb and Zn (Table 1).

6.16.2 Groundwater Sampling

During November 1981, ERT installed and sampled a temporary monitoring well in boring ERT-7 (Figure 8). The unfiltered sample was analyzed for PPM, nitrate and cyanide. Laboratory results indicated that Pb, Cd and Zn were present at concentrations of 5,100 ug/l, 4,300 ug/l and 50,000 ug/l respectively (Table 4).

During June 1987, Killam installed MW-8 to the south of the baghouse (Figure 8). Samples were collected June, July, August & September and analyzed for PP Metals. Samples collected during June were analyzed for PP+40. The samples were not filtered and the results represent total metals (Table 4 & 5). Analytical results identified Sb, As, Cd, Cr, Pb, Ni, Se and Zn. No organic compounds were detected.

In July 1989 EA sampled MW-8 for PP+40. Both filtered and unfiltered samples were collected in order to obtain dissolved and total metals concentrations (Table 4 & 5). The metals As, Cd and Se were present in the unfiltered sample at concentrations of 57.6 ug/l, 1,550 ug/l and 7,280 ug/l respectively.

In December, 1994 MW-8 was sampled by JMZ Geology for total metals (unfiltered), dissolved metals (filtered) and volatile organic compounds. The laboratory results indicated that Sb, As, Cd, Pb, Ni, Se, Tl and Zn were present in both filtered and unfiltered samples (Table 4 & 5).

6.17 LEAD SMELTER

6.17.1 Soil Sampling

During 1987, Killam Associates collected surficial soil sample S104 from the former smelter location (Figure 8). Killam states that the sample was collected from a location where contamination was most likely to be present and analyzed for PPM. The laboratory results identified Sb, Cd, Pb and Zn at concentrations of 2,862 mg/kg, 140 mg/kg, 2,185 mg/kg and 4,460 mg/kg respectively (Table 1).

In April 1988, Killam advanced boring B-4 in this area as illustrated on Figure 8. Three samples were collected and analyzed for PPM. The metals As, Cd, Pd and Zn were identified at concentrations of 430 mg/kg, 142 mg/kg, 40,700 mg/kg and 16,400 mg/kg respectively (Table 1).

Weston did work for ASARCO - 1991

Preliminary Assessment Report
Stolthaven Perth Amboy
920 State St.
May 2005

pg. 5-3, 5-4

to investigate and clean up the contamination (JMZ, 2001). Excavation and removal of PCB-contaminated sediments in the creek took place from March through June 1995. The contaminated material was reportedly transported for disposal off site (JMZ, 2001).

Post-excavation field PCB testing and/or laboratory analysis was performed on the remaining sediment in the creek section to confirm that cleanup was complete. However, initial post-excavation sample results indicated PCB contamination significantly exceeding 1 ppm at greater depths than originally excavated. Further excavation was performed, as well as supplemental field testing, until results indicated that residual PCBs were below 1 ppm.

Another concern of Cranes Creek reported in the JMZ work plan is the presence of horizontally stratified and partially indurated ferrous slag and scrap along the northern bank of the western portion of the creek. Although the exact source of the material is unknown, the stream bed appears to have cut into these materials, indicating that they were used as fill in the area prior to the pre-1940 straightening of the creek. The creek had formerly meandered across the south property. The eastern extent of the fill is uncertain, but it appears to underlie a large portion of Block 429 Lot 1, located in the northern portion of the Stolthaven property (JMZ, 2001).

5.5 Historic Fill

For the purposes of this discussion, historic fill is non-indigenous hydraulic fill and dredge spoil material placed on a site in order to raise the topographic elevation. No representation is made with regard to composition or presence of contamination. The regulatory definition of historic fill (i.e., NJAC 7:26 E-1.8) precludes ore-processing waste from being considered historic fill.

5.5.1 AOC-8 Hydraulic Fill Across the Property

Hydraulic fill was deposited in diked structures during a series of events at various times (ca. 1909 to 1970) to raise the elevation of nearly the entire Stolthaven Property, which was originally low-lying salt marsh (JMZ, 2003). Confirmation of the placement of historic fill is provided by 7.5-minute quadrangles prepared by the Department of Environmental Protection to meet the requirements of the "Brownfield and Contaminated Site Remediation Act". The hydraulic fill most likely resulted from channel deepening or dredging adjacent to piers.

5.5.2 AOC-9 Confined Disposal Facility (CDF)

In 1990, Stolthaven constructed the CDF on top of ASARCO process waste fill as a dewatering basin for dredge spoils generated from waterfront redevelopment. The CDF is located approximately 700 feet from the mean high water line of the Arthur Kill and is approximately 6.2 acres in size.

Water from the dredge material drained toward the Arthur Kill via a gravel-lined spillway. Surrounding the perimeter of the disposal area is a hard-packed soil berm, approximately 8 feet high and 10 feet wide. A small earthen roadway is located along the top of the berm, permitting site maintenance and access (Weston, 2003).

In late 1999 and continuing into early 2000, a maximum of 5,745 cubic yards of sediments were dredged from the Stolthaven ship and barge berthing area and were placed in the CDF. A smaller amount of sediments were dredged and stored at the southern end of the CDF in 1990 (Weston, 2003). Figure 2, provided in Appendix 14 of this PAR, depicts the location of the CDF on the Property.

5.6 AOC-10 Other Fill – ASARCO Process Waste Disposal Areas

The smelting and metal refining activities of ASARCO resulted in an undetermined amount of metal refining process waste materials being deposited over approximately 40 acres of the 75 total acres comprising the Stolthaven site. This is a highly variable mixture of materials consisting of slag, refractory brick, furnace scale, red building brick, black spongiform clinker, metal scrap, pipes, hoses, carbon electrodes, ceramic retorts,

formed concrete boxes and pipes, and various colored, granular sludge known as residues. The most abundant of the process wastes were granular and massive slag JMZ (2001). Of these materials, the primary sources of contaminants are slag and residues.

Borings and test pits were conducted by JMZ as part of a remedial investigation to delineate and characterize the process waste and hydraulic fill materials. A more detailed description of the fill materials is provided in Appendix 13 of this PAR.

5.7 Areas of Stressed Vegetation

Stressed vegetation has been noted throughout the Property, particularly in the vicinity of AOC-6, the former open water lagoon, and AOC-10, the former ASARCO process waste disposal area. As such, areas of stressed vegetation do not warrant a separate AOC designation.

5.8 AOC-11 Underground Piping

A sewer easement crosses the southwestern corner of the property. Storm water discharge piping from the Eastman facility reportedly runs north to discharge into Cranes Creek. Information made available to BBL to date does not indicate reported releases of hazardous substances relative to these piping runs.

5.9 Other Areas of Concern (AOCs)

5.9.1 AOC-12 Battery-Casing and Lead Smelter Slag Dump

As reported by JMZ's research (2001), NL submitted a Notification of Hazardous Waste Site to the USEPA in 1981 stating: "slag and battery casing from secondary lead smelter operation disposed of on site" and that the activity ceased in 1976 but did not specify the disposal location. Based on historic soil boring location maps in conjunction with aerial photos (photos not viewed by BBL), JMZ hypothesized that the primary area of disposal was located on Block 425 Lot 1.02 (Neuberne Brown property) and that NL disposed of slag and battery casings on this lot between 1970 and 1976 (JMZ, 2001). JMZ further states that in the 1970 photos, the area in question is uniformly vegetated; however, in the 1976 and 1979 aerial photos, the area was covered with graded black material and is connected by a roadway to the mid-section of the NL plant (JMZ, 2001). Additionally, JMZ states, "This material has been graded across the property line onto Block 425 Lot 1.01" (JMZ, 2001).

Field reconnaissance by JMZ (2001) and later by Weston (2002c) confirmed the presence of crushed battery casings and granulated black slag in the northwestern portion of the subject property, adjacent to the Neuberne Brown property. Battery casings and granular slag reportedly extended approximately 750 feet eastward along the south bank of Cranes Creek at the time of JMZ's site inspection (JMZ, 2001). Additional pockets of battery casings and black granular slag are found throughout the Property and appear to be the result of later grading and reworking during the period when the Property was owned by N. Brown (JMZ, 2001).

5.8.2 AOC-13 Crushed Drums

In 1990, during the construction of berms related to the CDF, an excavation described only as north of the Outerbridge Crossing was observed to be "contaminated with (yellow, red & white & green) substances and drums (crushed) were observed" (March, 1990 NJDEP Communications Center Notification Report). The location of this area of varicolored substances and crushed drums cannot be determined based on currently available information and was not observed during BBL site visit. The description of the varicolored materials is consistent with the previously described residue process waste residue.

6. Appendix 6 – Interpretation of Aerial Photographs, Sanborn® Maps, Historic Site Plans and Historic Topographic Maps

As referenced in the description below, the Stolthaven site area of interest consists of the properties that are the subject of this report: Block 425 Lot 1.01, Block 429 Lot 1, and Block 426 Lot 3.04.

A summary of BBL's review of the EDR Decades Package aerial photographs is provided below. A copy of the extensive aerial photograph review provided by JMZ (2001) is provided as Attachment 6-1 to this appendix.

Aerial Photograph Review (all photographs obtained from EDR):

1943 (1" = 750')
Photograph quality is fair. The Stolthaven site area of interest is bounded by the ASARCO property and future Chevron refinery to the north, the Arthur Kill to the east, undeveloped property and State Street to the west, NL Industries, Inc. (NL) to the northwest, and the Outerbridge Crossing Bridge and a largely undeveloped area to the south of the bridge with a tank farm consisting of five cylindrical aboveground storage tanks (ASTs) in a diked enclosure. A group of railroad tracks enters the site at its southwestern corner and branch out to the north, northeast, and northwest.

The Stolthaven site appears to be predominantly unpaved, vegetated, and undeveloped with what appear to be small channels or inlets at its eastern side, connecting to the Arthur Kill, and a number of what appear to be tracks or trails and areas of what may be disturbed soil. Remnants of the former creosote plant railroad tracks/sidings are visible, oriented northeast/southwest across the mid-section of the property. A pier structure is visible at the northeastern-most property corner, in the Arthur Kill. An area that appears to have been cleared or otherwise disturbed is visible at the northern property corner where the NL, ASARCO, and Stolthaven property boundaries meet. A smaller, highly reflective area of potential soil disturbance is visible to the southeast of that cleared area.

What appears to be a large, square-shaped lagoon/impoundment is present in the western portion of the Property, southeast of the NL site in the approximate location of the future Eastman Chemical facility. A crescent-shaped dike structure, approximately 800 feet in length, is located to the south of the lagoon. The channel of Cranes Creek appears to run along the southern border of the NL Industries property and then along the northern property boundary between the Stolthaven and ASARCO sites but is not completely visible. Buildings and stacks are visible on the adjacent former NL property.

1954 (1" = 750')
Cranes Creek is clearly visible along the southern former NL site boundary, curving north and then east along the ASARCO property line, with visible discharge into the Arthur Kill. A trail leading from the ASARCO eastern site leads southward into the center of the Property, where a ponded area surrounded by what appear to be disturbed/mounded piles of soil/materials is clearly visible. The square lagoon/impoundment is no longer visible and appears to have been filled in. The majority of the Stolthaven site surface appears to have been cleared and possibly regraded in places.

DEP file review

ASARCO

2008 PA report + addendum + RI work plan addendum

lead refining from both ores + scrap

Sb O, brass, Sn, $SnCl_4$, $ZnCl_2$

Bi, Cd, In, and precious metals

1160 Slade Street

* Copies p31, 32, 35, 40, 41, 42, 44, 56, 57, 58

62-65

and slag data

Lead Refinery

Lead Blast Furnaces

Reverbatory Furnaces

Brick storage bldgs